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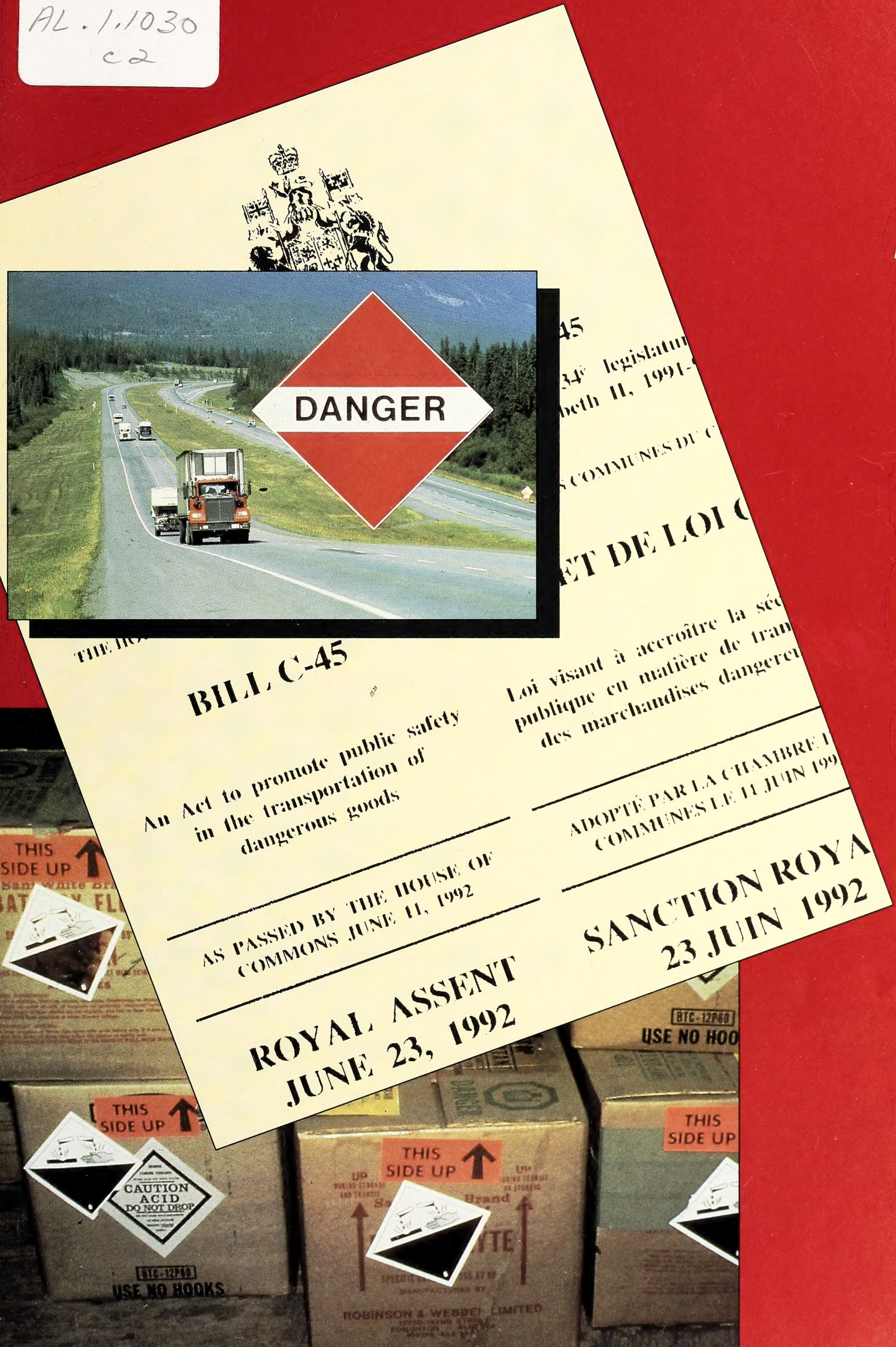
AGENCY INSIGHT



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An Act to promote public safety in the transportation of dangerous goods

AS PASSED BY THE HOUSE OF COMMONS JUNE 11, 1992

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JUNE 23, 1992

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The long and winding road

This month *Insight* provides all the goods on keeping dangerous goods off that long, winding and scenic Alberta road and securely on the truck where they belong.

So you're already familiar with this material? Of course! We don't assume otherwise. Our point is that it's important to review all the rules and tips we provide on a regular basis, to keep them fresh in your mind. To err may be human, but when you work with dangerous goods it can be fatal. You know that; we know that; the public knows that. So if we hammer a point over and over again, forgive us, but you probably know how preoccupied we are at Alberta Public Safety Services with safety. We hope you catch some of our cautionary ferver.

If this issue could be summarized in a phrase, it would be this: call us. Call us any time of the day or night at 1-800-272-9600 if you have questions about dangerous goods safety. We can answer right there and then over the phone, we can invite you to our office for a lengthier chat, or we can send one of our Dangerous Goods Inspectors around to work one-on-one with you on enhancing the safety of your dangerous goods operations. What's more, if you don't like the way the rules have been written, complain to us. We will listen. Count on it.

The contents of this issue have been very diligently supplied and reviewed by the staff of our Dangerous Goods Division. To provide other outlooks on dangerous goods activity, we've invited a representative of industry (Grimshaw Trucking) and a municipality (Calgary).

451-7112

This is our first all-D.G. issue, and we'd like to hear what you think, not only about the content, but about the language too. APSS supports plain English, even in technical matters. Call and let us know what you think. We just love critics...

BELIEVE IT OR NOT!

Insight is published quarterly by Alberta Public Safety Services (APSS). The publication aims to inform readers about current developments concerning topics which relate to the mandate of APSS: to prepare for, respond to and follow up on man-made or natural disasters in Alberta. This mandate includes activities in the areas of disaster services and management, as well as the handling, offering and transporting of dangerous goods.

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APSS Supports plain language please

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Alberta
PUBLIC SAFETY SERVICES

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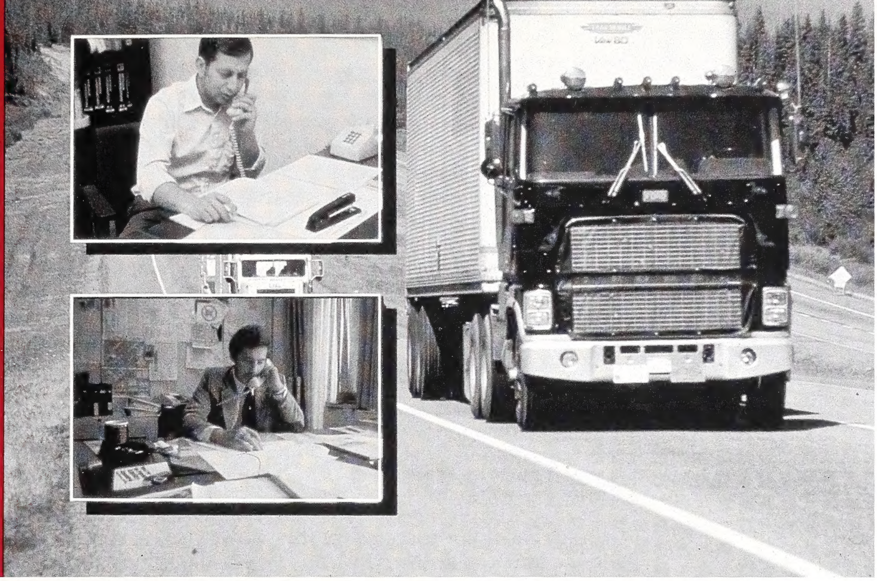


The safe transportation of dangerous goods is a team effort.

The Minister speaks his mind

Insight spoke with the Hon. Peter Trynchy, Minister, Alberta Public Safety Services, about his thoughts on dangerous goods legislation.

Alberta Public Safety Services is responsible for enforcing the dangerous goods legislation. Can you explain what this legislation entails?

In Canada, transportation of dangerous goods legislation is designed to minimize the chances of a highway accident involving a spill of dangerous goods. If an accident does occur, the legislation contains instructions on mitigating its effects.

As the Alberta government agency responsible for public safety, APSS ensures that provincial highways are as safe as possible. The dangerous goods legislation helps us do that.

This month, *Insight* contains a great deal of technical material, charts and statistics. Can you explain why this edition is so specialized?

The material in this edition is for individuals who work in the trucking and shipping industries, or who have a stake in complying with dangerous goods regulations. Remember, the legislation is evolving all the time. New technology and ideas help make safety regulations even more effective, and at the same time reduce the cost of these measures. We use *Insight* to communicate these changes to people who work with dangerous goods.

The purpose of *Insight* is to focus on one main topic each issue. This month it's time for us to update dangerous goods specialists with the latest information.

Are all the dangerous goods regulations really necessary?

I agree that the transportation of dangerous goods regulations are very long and complicated. They should probably be simplified. These national regulations are now under review by the federal government, and I hope that less complicated ones will result. However, they are important because they contain the information that ensures public safety wherever dangerous goods are being moved, information pertaining to the classification of substances, safety marks, training and emergency procedures.

In Alberta, we take public safety very seriously. I believe that education and awareness about dangerous goods will convince those who use them that safety pays. That is why our Coordination and Information Centre is available 24 hours a day, toll-free at 1-800-272-9600, and why the first priority of the APSS Dangerous Goods Inspectors is to visit people who want help complying with the regulations. Of course we will prosecute if we have to, but in my view, working with industry is far more productive.

What is Alberta's safety record in the transportation of dangerous goods?

Our track record is very good. Alberta has a population of roughly 2.5 million. We are the fourth largest province by population. However, except for Ontario, which has four times our population, we have a greater tonnage of dangerous goods on our roads than any other province. Over 3500 regulated dangerous goods move on our highways. But our conscientious enforcement of the regulations, combined with APSS' ongoing efforts to help companies comply with the legislation, has led Alberta to boast an enviable safety record.

Do dangerous goods regulations have any bearing on other highway users, such as you and I?

When I'm driving behind a big tanker truck displaying dangerous goods placards, it's reassuring for me to know that the driver has been trained to transport this material, and that the local fire department can tell from the placards how to deal with a potential accident. It's also good to know that provincial highway officials have safety-checked the vehicle at a weigh scale.

The bottom line is that dangerous goods regulations are designed to make our communities as safe as possible. We cannot legislate against accidents, but we can help prevent them from happening and we can also mitigate the effects of any that might occur. The dangerous goods laws have undoubtedly prevented accidents that might have had very serious consequences.

The year in review: mishaps of '92

Bill Smith
Chief Inspector, On-Highways

Human error is a significant factor contributing to dangerous goods spills. Reducing the number of dangerous goods incidents will take training, retraining and more retraining.

The traditional method of classifying an accident is to analyze the sequence of events which led up to it.

The investigation begins with the last episode in the sequence of events and extends as far back as practical. The goal is to obtain information that will lead to satisfactory conclusions as to how the incident was affected by environmental conditions; mechanical failure; operational factors such as faulty equipment, excessive speed, following too closely, failing to comply with a legal requirement; or

Human error

Mistakes happen when an individual copes inadequately with situations, because of:

- a belief that certain operations are unimportant
- a lapse of attention
- failure to pay attention to a given situation
- a deliberate decision not to comply with company instructions or legal requirements
- underestimating the risk
- poor training

Spills accounted for 53.6 per cent of the 181 regulated dangerous goods road-mode incidents that occurred in 1991. Most of the spills (64 per cent) occurred during transport, while 22 per cent took place during the unloading process and 14 per cent during loading operations. In all incidents, human error was the primary cause.

A lesson in loading goods

In Alberta, there is a legal requirement calling for cargo tanks to be blocked prior to loading or unloading LPG, in order to prevent movement. In a recent LPG loading operation, however, the driver made a cargo tank connection and then moved his vehicle forward to make another. During the movement (which the blocking would have prevented), the transport unit drove over the connected piping. This produced a leak. The escaping LPG ignited, destroying the transport unit and the loading racks. Estimated loss: more than $750,000.

This type of incident might be classified as human error. The error may have been due to a momentary lapse of attention, poor training or instruction, or a deliberate decision not to follow instructions or legal requirements.

In 1991, movement of transport units with product lines attached resulted in spills on four other occasions.

The following are examples of other incidents from 1991 which were caused by human error. These incidents were categorized as having been caused by inattention, poor training, or a deliberate decision not to follow instructions.

- Eight cases of transport units moving with an opened discharge valve
- A consignee provided the carrier with the wrong tank capacity, which resulted in an overflow spill
- A carrier made the wrong connection and discharged to an already filled tank
- A carrier made an improper hose connection, which caused the discharge line to become disconnected
- A carrier reversed the pump flow, resulting in a spill from the cargo tank which was supposed to be unloading
- Three cases of product escape were caused by carriers leaving the operation site unattended during the loading or unloading process
- Five cases of carriers overfilling the tank
- Two cases of the carrier off-loading into the wrong tank

Most of these are examples of routine tasks which went awry. In most cases, the failure to carry out a simple routine step was the cause. Yet the operators knew what was required of them. They had performed the tasks correctly in the past, and were capable of doing so again, had they not suffered a moment of inattention.

Load security

Insecure loading practices led to 14 spills in 1991. In most cases where load securement procedures are questioned, the standard reply is, "that's industry practice". Eight spills resulted from punctures to the container caused by other pieces of a consignment, nails in the transport unit floor or the old "forklift tongue through the drum" trick. What excuse is there for drums of paint falling off a transport unit deck? The operator suggested the deck was icy.

Environmental factors

Alberta's winter environmental conditions contributed to six incidents.

It is common knowledge that Alberta is ice-bound five months of the year. Therefore, attributing an incident to icy road conditions is at best a borderline excuse. Although bad driving conditions may have existed, they may not necessarily have caused the incident.

Training and experience should prevent mistakes in knowledge-based and skill-based behaviour. Company instructions should prevent mistakes in rule-based behaviour. Companies cannot lay down detailed instructions to cover all winter driving conditions, but can issue instructions to help people exercise good judgement and discretion.

Most Alberta trucking companies have a procedure which permits the operator to suspend operations until conditions improve. For this reason, the six incidents attributed to icy road conditions might be categorized as human error due to inadequate training or a deliberate decision not to follow instructions.

One post-accident investigation carried out by the Dangerous Goods Control Division of Alberta Public Safety Services determined that an LPG rollover was caused by the operator driving during a whiteout blizzard. Choosing not to pull over during such conditions is not a momentary lapse of attention, but a deliberate disregard for safety.

The road

One of the most common causes of a dangerous goods incident is the rollover. Road conditions and driving techniques are contributing factors in this type of incident. Last year's cases of rollovers included:

- three following-too-closely violations
- three stop sign violations
- nine speeding violations (to determine the appropriate speed, drivers must understand the operational limits of their vehicle, their own abilities and the roadway configuration)
- one case of driver fatigue
- a loaded refuelling truck backing into a construction evacuation site. (An Alberta Occupational Health and Safety regulation requires equipment not be moved on a construction site without the assistance of a signaller to guide the equipment operator)

It is suggested that these incidents are human errors which illustrate a deliberate decision not to follow instructions or legal requirements. One could argue, however, that some of these incidents might have been caused by lapses of attention or poor training.

Training

Vital elements in preventing motor vehicle accidents and dangerous goods incidents are driver skill and knowledge, both of which can be enhanced through appropriate training.

Driver performance in the operation of vehicles conveying dangerous goods can be improved through company training programs and by the supervision by safety coordinators.

Driver attitude is affected by company philosophy and a safe working environment. An employer who actively promotes and rewards responsible dangerous goods practices can establish safety as an employee responsibility. Properly conducted safety meetings can build good rapport between employees and management. Management's commitment to encouraging driver feedback can lead to agreement about organizational goals and the best ways to achieve them.

It might be beneficial to have drivers write government exams and undergo road testing. This way, they earn a commercial driver's license permitting the operation of a transport unit conveying dangerous goods or a bulk liquid tank.

The concept of commercial vehicle driver's license endorsements for dangerous goods and bulk liquid tank vehicles are recommended by APSS. Driver's license endorsement programs, by raising awareness of the risk of error, might potentially reduce the number of incidents caused by error.

Heading north in wintertime

Tom Hanna
Claims and Safety Manager
Grimshaw Trucking

PHOTO: TOM HANNA

The Dempster Highway: not for the faint-hearted.

From explosives for the mining industry to radioactive materials needed for medical purposes, carriers are required to transport all classes of dangerous goods. The transportation of dangerous goods up north provides carriers with many unique challenges.

The general merchandise carrier transports, in addition to dangerous goods, everything from mining equipment to groceries. Naturally the carrier must be vigilant to

On the road to Yellowknife: a Grimshaw driver puts chains on his tires.

ensure the safe stowage, segregation and securement of the various commodities and to effect delivery of the goods in the same condition as when tendered to the carrier.

Despite the harsh environmental conditions and the ever-changing road conditions, trucking continues daily. It is not uncommon for temperatures to drop below -40 C, providing the carrier with the challenge of ensuring the equipment is in top operating condition and the cargo is protected as required. Every fall the equipment is thoroughly inspected and all necessary repairs are made to ensure trouble-free operation during the winter months.

Inspections are conducted on the coolant hoses, fan, winter pump belts, fluid levels, air compressor, radiators, heater cones, alternators and the change to winter lubricants in the engine, and transmissions. In addition, the power units, trailers, van bodies, and cargo heating equipment also undergo a rigorous mechanical inspection. In cold temperatures, any minor problem can have major consequences. It is therefore paramount to ensure equipment is ready for the rigors of arctic conditions.

Operators of these units are very well experienced, and carriers provide additional training in defensive driving, the use of cargo heating equipment, tire chain installation and most importantly, the responsibility to shut down as a result of impassable road conditions.

The routes travelled in the north consist of paved and gravel highways, and of course seasonal highways, more commonly known as ice roads. These seasonal highways may take the form of snow packed roads cleared through the bush or through the barrens, ice highways traversing entire lengths of lakes or rivers, or a combination of both.

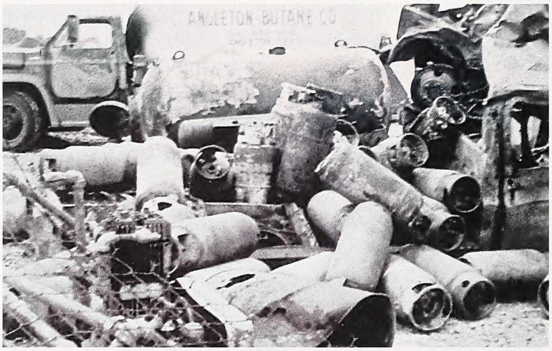
Northern roads challenge the equipment and also the driver's endurance. It is not uncommon for trucks to break through while traversing the ice crossings, nor is it unusual to cross iced-over rivers with up to a meter of water flowing on top of the ice. Such conditions are usually restricted to late winter or early spring ice crossings, but can sometimes happen in the middle of winter. Usually crossings of this nature are made with the driver's door ajar, not just for a quick exit, but to give the operator a little more confidence (that's always the excuse I give myself when I make these types of crossings).

All things considered, transportation of dangerous goods by road in the north can be accomplished if the necessary precautions are taken and an experienced driver is at the wheel.

Cover Story: Bill C-45

Call for comments

Ian Zaharko
Director, Regulatory Standards and Approvals



The following article provides some background into recent changes in the new federal Transportation of Dangerous Goods Act (1992). Insight readers are encouraged to submit to APSS written comments identifying any problems they have encountered with the Act, as well as potential solutions.

In 1977 the Transportation of Dangerous Goods Directorate of Transport Canada was created to provide the public, industry and government with a single legislative authority to deal with the handling and transporting of dangerous goods.

The first Transportation of Dangerous Goods Act was proclaimed in 1980 but had limited significance until July 1, 1985, when the Regulations came into force. The primary objective of the Act was to promote public safety in the movement of dangerous goods and also to establish comprehensive responsibilities for training, safety marks, packagings, documentation, registrations and remedial measures. The Act did not directly apply to provincially regulated transport modes or to intraprovincial transport, but it did contemplate negotiations between the federal and provincial governments with respect to enforcement in various provinces. Alberta has adopted the federal Regulations (parts I to IX) for provincial use, to ensure uniformity of administration and enforcement with federal requirements.

Between 1980 and 1990 deficiencies were discovered in the original federal Act. In the spring of 1990 Transport Canada began discussions with government departments and industry organizations to review proposals for improving the Act. APSS participated in the consultation on behalf of the provincial government.

As a result of this extensive consultation, the new federal Transportation of Dangerous Goods Act (1992) received Royal Assent June 23, 1992. Extensive amendments to the original 1980 legislation were enacted to provide a clearer framework for the regulation of dangerous goods.

The Act of 1992 strengthened:

- the federal/provincial dangerous goods partnership
- the means by which inspectors can help prevent damage to life, health, property and the environment
- the requirement that companies have emergency response assistance plans on hand prior to the shipment of dangerous goods
- the requirement that any dangerous goods and dangerous goods containers imported into Canada meet Canadian requirements
- a recall system for defective standardized means of containment
- the authority of designated persons to approve plans and permits and to issue directions
- financial liability of persons who handle, offer for transport or transport dangerous goods
- enforcement: a wider range of penalties allows the Courts to order public compensation, environmental cleanup or other contributions towards public safety.

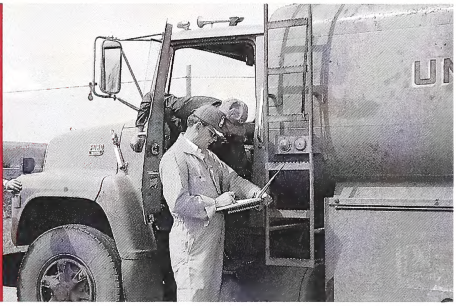
The Dangerous Goods Coordination and Information Centre at 1-800-272-9600 (or in Edmonton at 422-9600) is available 24 hours a day to answer any concerns pertaining to the Transporation of Dangerous Goods Act (1992).

APSS' Dangerous Goods Control Division has been reviewing the effectiveness of the changes to the Act. If you would like to comment on the Act, please write to:

Executive Director
Dangerous Goods Control
Alberta Public Safety Services
10320-146 Street
Edmonton, Alberta
T5N 3A2

FAX: 451-7199

Checking the results of *Roadcheck '92*



Since 1988, three-day roadside safety checks of commercial vehicles have been conducted in Canada and the United States. From May 12 to 14, 1992, the largest international safety check of commercial vehicles was conducted by participants from 101 law enforcement agencies at 202 locations. Alberta participated in *Roadcheck '92* at Coutts and Slave Lake, Alberta.

The objectives of the three-day North American checks are to improve public safety by removing unsafe drivers and vehicles from the highway system, and by increasing public awareness of the commercial vehicle safety issues.

The three-day checks also provide Dangerous Goods Control and Motor Transport Services with a North American snapshot. This snapshot enables both divisions to measure compliance rates, identify trends and implement selective enforcement and corrective actions with Alberta's commercial vehicle fleet operators.

Alberta uses the North American inspection procedure and accompanying "out-of-service" criteria to ensure uniformity of roadside inspections. Vehicles found to have out-of-service safety defects are removed from service until the defects are repaired. Drivers who do not meet the requirements, for example, by exceeding available hours of duty or by lacking dangerous goods training, are also removed from duty.

Nationally the three-day inspection snapshot indicates Alberta ranked fifth in movements of dangerous goods at selected static inspection sites, after the following provinces:

Manitoba	36.3%
Yukon	22.2%
North West Territories	21.3%
Quebec	17.4%

The three-day data reveals a North American Dangerous Goods out-of-service rate of 18.1 per cent. Alberta's out-of-service total was 4.1 per cent. This is a decrease from the 1990 Alberta rate of 11.7 per cent but an increase over the 1991 rate of 2.2 per cent.

Fortunately, the Alberta out-of-service rate for vehicle safety defects, 7.42 per cent, is far better than the North American rate of 26.15 per cent.

Total Inspections

Table 1

	Trucks	Non-DG Trucks	DG Trucks	Buses
North America	47,062	41,225 (87.6%)	5,138 (10.9%)	699 (1.5%)
Canada	10,222	8,840 (86.5%)	1,370 (13.4%)	12 (0.1%)
Alberta	1,940	1,649 (85%)	291 (15%)	0

Dangerous Goods Vehicle Inspections

Table 2

Total Insp.	Truck O-o-S*	Driver O-o-S	DG O-o-S	Total
291	24 (8.2%)	4 (1.3%)	12 (4.1%)	40 (13.6%)

* out of service

Insight taken to task

Editor's note: *The following letter to Insight comes from Ken VanDewark, Refinery Manager of Parkland Refining Ltd. in Innisfail, Alberta.*

Normally I find your articles interesting and fairly accurate, but the article on MTBE in your September 1992 issue was flawed in several areas and expressed a clinical view. Let me add a few points:

1 MMT is not the same as TEL and yet you tended to wrap them both in the same blanket. MMT has never been proven to be harmful to the environment, in fact recent tests done in the US have shown that gasoline using MMT has significantly less tailpipe pollution than any of the other conventional blend and it is just as good as any blends with MTBE. Politically the wrong results to support a crusade, but interesting?

2 MTBE does not enhance the octane rating of gasoline other than by adding its share of its own octane, which happens to be fairly high. MTBE is not economically or effectively a direct replacement for lead. TEL and MMT do enhance the octane of all components and were a great multiplier in the overall octane. If we were to add MTBE to gasoline to get the same effective octane enhancement as TEL, it would be probably the most hygienically harmful gasoline going and the most expensive.

3 Alcohols are hygienically not good actors. There are equally as many health problems associated with complex alcohols as with lead, but our political world (political press) has been so quick to "band-wagon-hop" onto the "out-with-lead campaign" that they haven't been paying much attention to the potentials of the alternatives. MTBE is from the same family of alcohols that has a proven track record of health problems. I have never seen nor heard of a health study made specifically on MTBE. I wonder why? Are the new plants, more jobs, clouding an issue? Will we have an "out-with-MTBE" political campaign in ten years? Good political fodder, should be good for at least one election.

4 In the '70s, a study was commissioned by our federal government to prove how badly leaded gasoline contributed to environmental lead poisoning. Soil and dust samples were collected along the Queen Elizabeth Way (QEW) and Gardiner expressways in Toronto. At the time, I was driving one of the millions of lead-spewing cars on those highways and, with a young family living a few blocks off the QEW, I was very much interested in the outcome. After several years with no report, I did a little back-door investigating, only to find that the study did not support the direction the federal environmental department wanted to go, so it was quietly shelved.

5 TEL-LEAD! LEAD! IT KILLS! True, lead in the right form is a poison. Even turns the human mind to a vegetable! It is significant however, that the EPA in the process of banning TEL dropped entirely any reference to health effects and went entirely on the fact that leaded gasolines clearly had a higher level of tailpipe pollutants, CO, NOX, particulates, etc. On this basis I would agree to eliminate lead as did the EPA. But remember that no studies done by the EPA on lead in gasoline were able to tie gasoline lead to health effects.

6 The only manufacturer of gasoline TEL in Canada has just recently requested approval to double its plant capacity, with all production to go offshore to Europe and other foreign countries. Either these countries are stupid, they know something we don't, or they are not quite so quick to get on the bandwagon. This decision, right or wrong, has cost Canada billions of dollars.

7 Leaded gasoline is still allowed in the US, but we in Canada are absolutely clean. Clean even to the point of sending in "hit teams" to close down lead use at race tracks, where there was no other real choice available. Gasoline was not available on the market with octane sufficient to operate the cars. Interesting?

As a public information watchdog, shake loose of your political strings occasionally and dig a bit deeper.

Ken VanDewark
Refinery Manager
Parkland Refining Ltd.

***Editor's note:** Insight sent the letter reprinted in this month's Viewpoint to the Environmental Resource Centre in Edmonton. The ERC is an independent agency not affiliated with Alberta Public Safety Services. Here is their response, prepared for Insight by Louise M. Swift of the ERC.*

MTBE or not MTBE?

Our dependence on the automobile is a problem that we are going to have to face up to

Ken VanDewark's letter is interesting. In his first point, he suggests that "MMT has never been proven to be harmful to the environment". This statement begs a response. MMT is exactly what lead was, back in the early 1920s. Manganese, like lead, is a heavy metal and there are alarming reports of brain diseases among those who mine or process this product. Evidence is mounting outlining the potential public health effects, especially amongst children and the unborn in inner city locations. As with lead, exposure to manganese results in neurological disturbances, headache, nausea, anorexia, asthenia and occasional psychotic behaviour.

Mr. VanDewark states that *"no studies done by the EPA on lead in gasoline were able to tie gasoline lead to health effects"*. Many studies have indicated that airborne lead is a significant cause of health problems. When the five petitioners, Ethyl Corporation, PPG Industries, E.I. Dupont de Nemours and Company, NALCO Chemical Company and the National Petroleum Refiners Association (the anti-knock industry) tried on May 30, 1975 to have the decision reducing the lead content of gasoline overturned, the court found "a vast mass of evidence" indicating that "the emission products of lead additives will endanger the public health".

The court decision continued, "for years, the lead anti-knock industry has refused to accept the developing evidence that lead emissions contribute significantly to the total human lead body burden." Mr. VanDewark suggests that the decision to remove TEL from gasoline sold in Canada has cost Canadians collectively billions of dollars and therefore for that reason it was a bad decision. This same reasoning would put DDT, PCBs and CFCs back on the market and we would still be using thousands of products made from asbestos.

Lead contamination is found in virtually every corner of the planet. Vehicle emissions account for 80 per cent of it. According to an article in the May/June 1992 issue of Mother Jones magazine: "With the ever-increasing use of cars in Third World countries and the high proportion of children among these populations, the dangers from the use of leaded gas are obvious. 'We can reasonably expect childhood lead poisoning to reach truly epidemic proportions in many Third World cities,' says David Schwartzman, a professor of geology at Howard University." So it would seem that controls on the use of TEL are needed just as badly in the rest of the world as they are in North America.

As for studies done in Canada, I suspect that the study of soil and dust samples collected along the Queen Elizabeth Way and Gardiner expressways in Toronto, about which Mr. VanDewark writes: "the study did not support the direction the federal environment department wanted to go so it was quietly shelved": I believe it is more likely that the results were "quietly shelved" because they were so damning.

At everyday levels, exposure to lead puts children especially at risk of reduced I.Q., learning difficulties, behavioural problems and hyperactivity.

Unless we are willing to address these problems now, we are doomed to make the same mistake with MMT as we did with TEL. Is it up to the manufacturer to prove that the product is safe, or up to the government to prove it is not? Are marketable products in the same category as human beings — innocent until proven guilty — or should the burden of proof of safety lie with the private interests who stand to reap the profit?

Our dependence upon the automobile, with all its attendant negative impacts, from the problems associated with gasoline additives to the fact that the automobile is a major contributor to global warming, is a problem that we North Americans are going to have to face up to soon. Not to mention the pollution caused by oil spills: the Exxon Valdez spilled 40 million liters into Prince William Sound in Alaska and just recently the tanker Braer spilled 90 million liters into the North Sea off the shores of the Shetland Islands. Additionally, the million of liters of oil and gasoline spilled all over the world from leaking pipelines and underground storage tanks contribute to thousands of contaminated sites which carry a price tag of millions of dollars to clean up.

As for MTBE, the Environmental Resource Centre has very little information on it as yet. Rest assured, we will speak out as needed and as information becomes available.

A parting thought: historians have theorized that the use of lead in plumbing, cookware and cosmetics helped bring about the decline of the ancient Roman Empire. That's something we should also be thinking about.

Guide for Manufacturers and Vendors of Dangerous Goods Means of Containment

The new federal Transportation of Dangerous Goods Act, effective as of June 23, 1992, has placed new means of containment responsibilities upon manufacturers and vendors. Should you make or sell any means of containment you will be held liable for their integrity in transportation.

Section 5(c) of the same Act regulates the manufacturers and vendors of dangerous goods "means of containment". Section 5(c), effective as of June 23, 1992, reads:

> No person shall handle, offer for transport or import any dangerous goods unless the means of containment and transport comply with all applicable prescribed safety standards and display all applicable prescribed safety marks.
>
> Safety standard means standards regulating the design, construction, equipping, functioning or performance of means of containment...

Section 6 of the same Act reads:

> No person shall display a prescribed safety mark on a means of containment or transport, or at a facility, if the mark is misleading as to the presence of danger, the nature of any danger or compliance with any prescribed safety standard.

Section 7.30 of the Regulations reads:

> No person shall display, or cause to be displayed, the marks required by the standards referred to in Section 7.31 (packaging of Class 1) or 7.33 (general packaging requirements of 7.21 or CGSB to be met) on a packaging or small container that contains dangerous goods unless the packaging requirements prescribed by those standards in respect of the dangerous goods are complied with.

Anyone who makes or sells means of containment for the shipment of dangerous goods made to a safety standard listed in Schedule XIV or not is subject to these legal requirements.

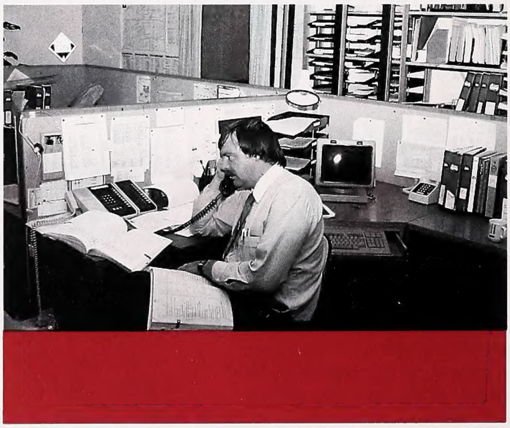
The purpose of this guide is to assist in conducting a review of compliance procedures in the manufacture or sale of dangerous goods means of containment. The guide does not include complete reference to the applicable safety standards outlined on Schedule XIV of the Regulations.

It is your legal obligation to comply with the requirements. It is therefore essential to keep up-to-date copies of the Act, Regulations and safety standards on hand to protect your company and its employees.

The Coordination and Information Centre (CIC) at Alberta Public Safety Services provides information on the Regulations 24 hours a day.

Toll-free: 1-800-272-9600
Edmonton: 422-9600

John Harpin, Director of the CIC, takes a call.



Poster pull-out

A Consignors' Guide to Dangerous Goods

Step 1 Determine the proper shipping name

The consignor must determine the proper shipping name of the product as detailed in Part III of the DG Regulations, and Schedule II, Lists I and II. (Sections 3.1. & 3.6)

Step 2 Determine the dangerous goods class or classes

a) Refer to Schedule II, List I or II to determine the classification, product identification number and the packaging group assigned.

Step 3 Emergency response assistance plans

Consignors are required to file an Emergency Response Assistance Plan for certain quantities of all Schedule XII listed dangerous goods.

Step 4 Determine the mode of transport

The modal requirements may affect:

Packaging requirements
Quantity per package
Safety mark requirements
Shipping document requirements

Step 5 Select and use the proper packaging

No person shall offer dangerous goods for transport unless the dangerous goods are packaged in accordance with the safety requirements.

When selecting an authorized packaging, consult this list:

NON BULK

Class 1	CAN/CGSB 43.151-M90	Jan 92	Sec. 7.31
Class 2	CAN/CGSA-B340-M88	Jan 92	Sec. 7.32
Classes 3,4,5 6.1,8,9	CGSB 43-GP-152MP or per section 7.21	Jan 92	Sec. 7.33 7.21

BULK

Liquids in:

Class 3.3	PG III
Class 4	PG II or III
Class 6.1	PG III
Class 8	PG II or III
Class 9	PG II or III

are permitted in TC 225 containers:

CSA-B616-M1989	Jan 1992

Other classes:

Class 2	CSA-B622-1987	June 1995	Sec. 7.32.1
Classes 3, 4, 5 6.1,8	CSA-B621-1987	June 1995	Sec. 7.33.1

Step 6 Apply proper safety markings to packaging

Before dangerous goods are transported the consignor shall display all the required safety marks.

a) Labels, shipping name and PIN (Sec. 5.7 and 5.37)

b) Required manufacturing packaging markings, for example a Class 2 type cylinder:

TC 4BAM 17 XYZ 12345 86 + 09
(per clause 4.16 of CSA-B339-88)

Step 7 Prepare shipping documentation

It is the responsibility of the consignor to prepare the dangerous goods documentation for each consignment of dangerous goods offered for transport (Sec. 4.4)

a) The shipping documents must contain the specific information detailed in Part IV of the regulations (Sec. 4.8)

b) For additional requirements see Sections 4.9 to 4.22

Step 8 Determine placarding requirements

The consignor must make the determination upon:

What placards are required	Sec. 5.16
Display location	Sec. 5.29
When the PIN is required	Sec. 5.23
The retro-reflective requirements	Sec. 5.27

Step 9 Load securement

The person loading a transport unit shall ensure the dangerous goods are loaded to prevent damage to the means of containment, or goods or the transport unit under normal conditions of transport (Section 7.38).

Step 10 Reporting requirements

The person who has charge, management or control of dangerous goods at the time he discovers or is advised of a dangerous goods occurrence shall make an immediate notification of the dangerous goods occurrence (Sec 9.1 and 9.13).

This guide is intended to assist the consignor with the shipment of dangerous goods. For specific Regulatory details, consult the Transportation of Dangerous Goods Regulations for the exact requirements for the shipping of dangerous goods.

The Coordination and Information Centre (CIC) at Alberta Public Safety Services provides information on the Regulations 24 hours a day.

Toll-free: 1-800-272-9600
Edmonton: 422-9600

Poster pull-out

ALBERTA PUBLIC SAFETY SERVICES
AGENCY INSIGHT

Reducing the danger on dangerous goods routes

Bill Bruce
Traffic Services Coordinator
City of Calgary

Calgary Police Service Truck Unit conducts a routine inspection to ensure compliance to the truck and dangerous goods regulations.

History of dangerous goods routes in Calgary

The city of Calgary first established dangerous goods routes and by-laws governing the transportation of dangerous goods in 1979. These restrictions formed part of the Truck Routes By-law at the time. The initial routes were selected from existing truck routes based on perceived industry need with some visual monitoring being done to determine the desired travel routes. Calgary faced problems with existing infrastructure that are common to most established cities. Typically, earlier development practices are not always compatible with the "ideal" dangerous goods route. As new roadways are built, the desirable features of a dangerous goods route, such as larger setbacks for development, can be accommodated in the design of the project.

The selected routes were identified on the city's truck route map and signs were placed at the entrances to the city outlining the primary dangerous goods route and directing dangerous goods inquiries to the Fire Marshall.

In establishing a dangerous goods route system and by-law, Calgary was fortunate to have a specialized unit in the Calgary Police Service trained to enforce truck and dangerous goods regulations. A primary goal of this Truck Unit is to achieve compliance to truck and dangerous goods regulations through a proactive approach, consisting of education by direct interaction with operators.

In 1986, the city of Calgary was advised that changes to provincial legislation required that the Minister of Alberta Public Safety Services (APSS) approve by-laws that pertained to the transportation of dangerous goods. Working with APSS staff, Calgary transportation officials used the existing provisions in the Truck Routes By-law as the foundation to develop the Dangerous Goods Route By-law 67M87.

Managing the transportation of dangerous goods in Calgary

With the development of this specialized by-law, a need was identified to:

a) establish a formal committee to address dangerous goods transportation issues;
b) advise city council;
c) maintain ongoing liaison with APSS.

Membership on the committee consists of representatives from various city departments, Calgary Health Services, the Alberta Trucking Association and APSS. A primary function of the committee is to review requests for new routes and advise city council accordingly. Typically, requests for new routes come from industry. A review is done by each committee member, drawing on the expertise available in the respective departments. At a follow-up meeting, the committee members share information, assess the risks and weigh them against the need for the route. A recommendation is then developed. If the route is recommended, a report is prepared for city council recommending a by-law amendment.

The committee also deals with the transportation of dangerous goods in the downtown core and evaluation of routes where there may be cause for public concern.

In 1989 there was a great deal of public concern over the use of Glenmore Trail as a dangerous goods route. Glenmore Trail was one of only two routes available for east-west traffic, but it also crossed over the city's main water supply, the Glenmore Reservoir. The other route was 16 Avenue N. (Trans-Canada Highway) which was already heavily congested. Deleting the route was not a workable solution. The only alternative was to reduce the risks to an acceptable level. While the route carried a very high volume of traffic with a posted 80 km/h speed limit, the accident history was not indicative of a high risk area.

However, the consequence of an incident would be serious. After reviewing the types of goods that were being transported, it became apparent that, with early notification, most spills could be managed. The one noted exception was Class 6 goods (poisonous and infectious material). The solution was to restrict Class 6 loads on the causeway and install emergency solar powered cellular telephones at the site with direct connection to the 911 centre. Storage cabinets were placed at the site to stockpile spill management materials, so that first responders would have an adequate supply of material on hand in the event of an incident.

The future of dangerous goods routes in Calgary

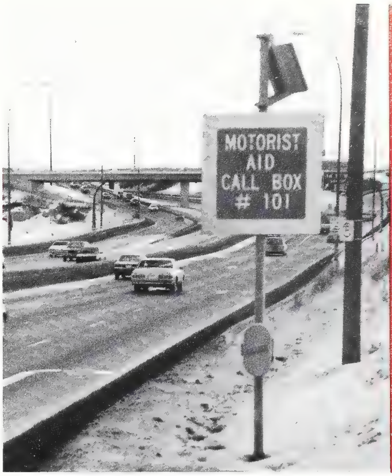
The Glenmore Reservoir situation pointed out the need to do a more detailed analysis of all the dangerous goods routes in the city. In 1992, two engineering students were hired to work in the Traffic Operations Division for the summer. It was an ideal opportunity to study the city's existing dangerous goods routes and use the data collected to conduct a comprehensive risk analysis.

In designing the study, we were fortunate to have a great deal of background information at our disposal; i.e. background traffic volumes, accident data and reports on all dangerous goods related accidents. However, we did not know the number of vehicles that were transporting dangerous goods, nor what they were carrying. As it was not practical to stop every truck, it was necessary to assume that most vehicles were complying with the placarding requirements. A spot check, done with the Calgary Police Service Truck Unit, confirmed this assumption.

To get an overall picture of the goods being moved, 22 strategic locations were selected to count the number of trucks passing that point and to record placard class, UN number and truck configuration (single unit, truck and trailer or multiple trailer). Data was collected from 7 a.m. to 10 p.m. at each location. These count figures would then be blended with the background traffic data to determine what percentage of the traffic was dangerous goods vehicles.

Due to the extremely low number of incidents involving dangerous goods vehicles, it was not possible to draw any conclusions based on that data. It was decided to look at the overall accident rate for the various locations and make the assumption that the dangerous goods traffic on the street would be exposed to the same risks as the background traffic. Therefore, the percentage of dangerous goods traffic would have a direct, proportionate relationship to the accident rate. For example, at 16 Ave. and 19 St. N.E. the traffic study recorded 95 placarded vehicles. The known traffic volume was 50,725 vehicles per day. Therefore, dangerous goods vehicles represented 0.19 per cent of the total traffic. Since the known accident rate at this location is 2.97 accidents per million vehicles, the risk of an accident involving a dangerous goods vehicle is then 0.19 per cent of 2.97, or 0.0056 accidents per million vehicles. This equals approximately one accident in 178,000,000 vehicles. This figure simply represents the risk of a dangerous goods vehicle being in an accident, and does not necessarily mean that the accident will result in a spill.

The dangerous goods route on Glenmore causeway has two solar powered help phones that truckers may use in the event of a spill to alert emergency services.

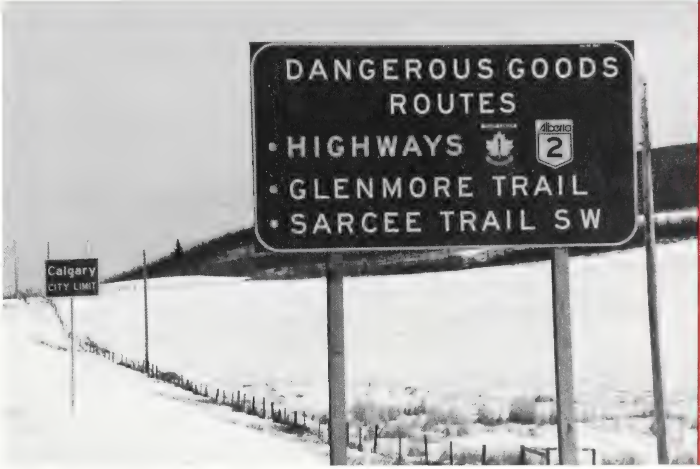


For the purpose of our analysis, we use a rate of 1 in 100,000,000 as an acceptable level of risk. Any location that does not meet the criteria will be examined to see if the risk might be reduced by engineering solutions such as improvements to the traffic control devices or roadway design, reducing speed limits, or partially restricting the transportation of dangerous goods by class or time of day. In addition to using engineering solutions to reduce risk, the city would continue working with industry to identify action that drivers can take to reduce risk at known higher risk locations.

The purpose of our study was to evaluate and reduce risk in the transportation of dangerous goods in the city and does not specifically address the consequences of an incident, for that is the responsibility of the Calgary Fire Department. Their Disaster Services Division is prepared and equipped to deal with any potential event, including dangerous goods incidents.

(For more on dangerous goods routes, see the back cover.)

Signs, such as this one, are posted on roadways entering the city advising truckers of the dangerous goods routes.



All you ever wanted to know... about permits

Ian Zaharko
Director, Regulatory Standards and Approvals

Alberta's Transportation of Dangerous Goods Control Act and Regulations govern the handling, offering for transport and transportation of dangerous goods for highway transportation within Alberta. The Federal Act and Regulations regulates air, rail, marine and extra-provincial highway transportation.

There are two types of permits:

- **Exception**
  This permit may be used to exempt the applicant from all or part of the requirements of the Regulations.
- **Equivalent level of safety**
  This permit allows dangerous goods to be handled, offered for transport or transported in a manner that does not necessarily comply with the Regulations, but is equally safe.

The topic of dangerous goods permits is addressed in Sections 4 and 5(1) of the Transportation of Dangerous Goods Control Act and Part 2 of the Administration Regulations (Alberta Regulation 37/86). Applications for intra- and extra-provincial transport may be made simultaneously to Ottawa and to Alberta Public Safety Services.

Note: For the everyday handling, offering for transport or transporting of dangerous goods, permits are not required.

Federal and provincial permits involve products transported from their place of origin to the destination addressed in the permit. For example, a permit might allow a corporation to label a product in a different way than the Regulations allow. This permit will then apply to all subsequent companies that receive the product and reship it to other Alberta destinations. A federal permit is necessary for the permitted product to be shipped outside Alberta.

The approval process

Each permit application received at APSS is processed as soon as possible. We evaluate it, draft the permit and then consult with the applicant and also with authorities in other provinces and in Ottawa if necessary.

Here are some tips on how to avoid unnecessary delays in the approval process:

a) A permit must be issued to a person. Legally this can be an individual or a company. An association may apply on behalf of its members.

b) The applicant must use legal names. For example, XYZ Corporation operating under the name ABC must send in the application under its legally incorporated name of XYZ Corporation. The operating name may be added in parentheses.

c) All telephone and fax numbers and addresses of contact personnel must be current and accurate.

d) Include correctly referenced sections of the Regulations.

e) The entire permit application must be completed accurately and all relevant information attached, such as Material Data Safety Sheets, drawings, proposed transport routes and other background information.

For more information, contact:

Ian Zaharko
Director, Regulatory Standards and Approval
Dangerous Goods Control Division
APSS
10320 146 Street
Edmonton, Alberta T5N 3A2
Tel.: (403) 451-7132
Fax: (403) 451-7199

Remember: an incomplete application will result in an unnecessary delay. Furthermore, all conditions of the permit must be followed, without exception. Failure to comply with all of the conditions means the permit is no longer applicable, and the permit holder must then fully comply with all applicable requirements of the Regulations without exception.

For information on permit applications outside Alberta, contact:

Permits Coordinator, Regulatory Affairs Branch, Transport of Dangerous Goods Directorate, Transport Canada, 14th Floor, Canada Building, Minto Place, 344 Slater Street, Ottawa, Ontario K1A 0N5. Tel.: (613) 998-0519. Fax: (613) 993-5925.

For B.C. permits, contact:

Dangerous Goods Director, Superintendent of Motor Vehicles, Motor Vehicles Department, Ministry of Transportation and Highways, 2631 Douglas Street, Victoria, B.C., V8T 5A3. Tel.: (604) 387-5585. Fax: (604) 387-3017.

Summary

- Alberta permits apply only to the handling, offering and transporting of dangerous goods by road within in the province of Alberta.
- The permit is not a license that exempts the overall application of the Regulations and is subject to cancellation, amendment and non-renewal.
- All conditions of the permit must be strictly followed. Failure to comply with any one condition of the permit will make the permit inoperative and place the permit holder in a position of absolute compliance with the Regulations.
- The majority of permits call for a copy of the permit to accompany each shipment. This requirement prevents permit holders from being mistakenly accused of non-compliance with the Regulations, and helps emergency response personnel identify the dangerous goods in case of an accident.

One final reminder

Permit holders must comply with all conditions of the permit. Your safety and that of the public depends on it.

TELEPHONE NUMBERS

Dangerous Goods Control Division, Alberta Public Safety Services

S.P. Hammond, Executive Director, Dangerous Goods Control	451-7107
W.W. Smith, Chief Inspector, On-Highways	451-7138
L.S. Knight, Chief Inspector, Facilities	451-7136
J. Harpin, Director, Coordination and Information Centre	451-7131
I. Zaharko, Director, Regulatory Standards and Approvals	451-7132

APSS' 24-hour Coordination and Information Centre (CIC):

Edmonton area: 422-9600 Outside Edmonton: (toll-free) 1-800-272-9600

APSS takes a new look at audits

Alberta Public Safety Services (APSS) administers the Transportation of Dangerous Goods Act and Regulations which govern the handling, offering for transport and the actual transportation of dangerous goods on Alberta highways. One of APSS' objectives is to encourage voluntary compliance with safety legislation.

In keeping with the APSS mandate of promoting public safety in the transportation of dangerous goods, two auditing procedures are being introduced for both the private and public sectors. The first is the Management Self-Evaluation Audit and the second is the Facility Inspection and Investigation Audit.

The objectives of the auditing procedures are to promote public safety in the transportation of dangerous goods, enhance the auditee's image, improve management commitment to safety, minimize a company's liability and improve performance and compliance.

Management Self-Evaluation

In simple terms, this audit process begins moving a company from the "react" mode to the "anticipate and prevent" mode.

The Management Self-Evaluation Audit verifies past and present compliance with the regulations, corporate policies, standards and good operating practices. Discrepancies and deficiencies from the requirements must be identified and corrective action be implemented. An internal audit process demonstrates that both the legal and moral responsibilities are being measured and would support a due diligence defence.

Due diligence is the most common defence to offenses under the Transportation of Dangerous Goods legislation. In *Regina vs City of Sault Ste. Marie* (1978), the Supreme Court of Canada ruled that an accused can avoid liability by establishing that all reasonable care was taken.

In other words, an employer may be convicted of an offence committed by an employee or agent, unless it can be proven that:

- systems were in place to ensure compliance with the legislation
- reasonable procedures were in place to prevent offenses
- the offense was committed without the employer's approval

This judgement provides an excellent rationale for performing audits.

This audit also includes an intangible benefit: risk assessment, the identification of potential liabilities or hazards which may threaten the health and safety of the worker, the public or the environment.

The process

A senior manager begins the Management Self-Evaluation Audit by reviewing internal documentation related to dangerous goods handling, offering, transporting and other safety issues. This prepares the senior manager to respond to the audit questionnaire and evaluate its results.

The yes/no questionnaire that follows is an essential component of the audit process, since it assists in assessing whether internal management procedure is acceptable or not. Deficient or borderline operations or procedures should be marked as "no", to allow for review or refinement of these areas.

The audit results will reveal:

- the strength of management commitment to safety and the degree to which employees have bought in to this commitment
- the degree of conformity with government requirements
- the effectiveness of established company standards and management control
- areas for management to review or address with corrective action

Facility Inspection and Investigation

This audit examines all of a company's statutory and corporate policies. It enables managers to determine whether the company's goals and standards are being met. It also helps companies monitor how well the regulations are being followed, and to identify trends which require management attention.

This audit is usually initiated either by the management of the company or after an inspector has established reasonable grounds, such as:

- a dangerous goods incident resulting in death, injury or extensive property or environmental damage, caused by a flagrant violation
- an indication, according to APSS records, of a high incidence of violations or complaints

Four key steps

The Facility Inspection and Investigation Audit consists of the following steps:

1) prior to the audit, the company collects all relevant information
2) the audit opens with an interview in which the auditor asks about management policies and systems
3) the auditor evaluates the information and evidence produced during the audit
4) the auditor writes a report

For more information, please call Bill Smith, Chief Inspector, On-Highways at 451-7138 in Edmonton.

Typical TC Packaging Marking

1 STC
2 TC 17E
3 18 46 84 5
4 ENS

Interpretations:

1 Single trip container
2 TC regulating authority, specification to which the drum was made
3 Gauge of metal in the body, capacity in litres of a TC drum year of manufacture, and month of manufacture
4 Symbol of drum manufacturer

Until December 31, 1994, a manufacturer may mark a package with either "CTC" or "TC". In the case of packaging for classes 2 (gases) and 6.2 (infectious substances) the packaging must bear the "TC" specification code.

Rx for DG packaging

Packaging for non-bulk and large containers, other than highway tank transportation of dangerous goods, requires all packagings to be designed, constructed, selected, filled and used to prevent a discharge during transport.

A handler or offerer of dangerous goods will be required to have a basic understanding of the packaging standards, markings, selection and use criteria.

Part VI of the Transportation of Dangerous Goods legislation incorporates, by reference, the safety standards for the design, construction, and retesting of various types of packagings. Any person marking a packaging as conforming to these standards is responsible for ensuring that the safety standards are met.

The use of packaging for the transportation of a particular dangerous good is detailed in Part VII, entitled Safety Requirements for the Handling or Offering for Transport of Dangerous Goods. Part VII also contains loading, segregation, securement and other requirements for the preparation of consignments.

Parts VI and VII and schedule XIV make up the packaging and handling requirements for domestic shipments by road, rail and water, except those relating to the selection and use of highway tanks (cargo tanks). Highway tank requirements become effective 1 July 1995.

CAN/CGSB-43.150-M89

Performance packaging for transportation of dangerous goods: UN specification packaging and containers — effective January 1992 (sec. 6.4)

This standard contains the requirements for packagings based upon the United Nations Recommendations on the Transport of Dangerous Goods.

Section 7.23 of the TDG regulations implements the UN packaging in Canada. The safety standard is CAN/CGSB-43.150-M89 Performance Packaging for Transportation of Dangerous Goods. It contains the general, performance, construction, marking, testing and quality assurance manufacturing requirements.

UN packaging filled in Canada must meet the Canadian standard. Packaging displaying a year of manufacture of 1992 or later must be registered with Transport Canada. (Sections 8(1)(i) and 11 of the standard per Sec 7.23 of the Regulations).

A quality assurance program must be in place by 1994. (Sec. 10 of the standard).

The TDG Directorate provides a leaflet entitled Guide to CAN/CGSB-43.150, which explains the procedure for testing UN packagings and the use of the standard generally.

Contact: Transport Dangerous Goods, Transport Canada, Ottawa, Ontario K1A 0N5.

Registration and reports for manufacturers and vendors

1. Packaging of small containers

(a) Manufacturers of UN packaging manufactured after January 1, 1992 must register their design with Transport Canada if the packaging is filled in Canada. (Section 6.4(a) and Section 7.23(2))

(b) The implementation of quality assurance programs does not apply to UN packaging manufactured before January 1, 1994 (Section 6.4(2) and 7.23(3)).

2. Cylinders, spheres and tubes

(a) Certification of compliance and test reports to be retained for certain time periods (Section 6.5)

(b) Requalification, repair, reheat and rebuilding reports to be retained for a certain time period (Section 6.5)

(c) Requalification by retesting and reinspection, reheat treatment, repair and rebuilding of used container requirements to be complied with (Section 7.32 and clause 24 of B339-88)

(d) Registration with Transport Canada for the manufacture, requalification, repair, reheat treatment and rebuilding of used containers. (Section 7.32 and clause 25.2 and 25.3 B339-88)

(e) Registration with Transport Canada of Inspectors for the inspection, testing, and certifying of new, reheat treated or rebuilt used containers. (Section 7.32 and clause 25.4 of B339-88)

(f) Manufacturers and requalifiers must mark their registered symbol on all containers they manufacture or requalify. (Clause 4.16.2 B339-88)

(g) All new cylinders must comply with B339-88 (Section 7.32(2)(a)).

(h) Compliance options for older cylinders (Section 7.32(2)(b)).

3. Highway tanks

(a) Registration as a manufacturer of tanks and design qualification test reports does not apply to tanks manufactured before July 1992. (Section 6.6)

(b) After June 1995 the inspection, retesting and maintenance requirements of highway tanks and portable tanks used for the road transport of products in Classes 2, 3, 4, 5, 6.1 or 8 must be complied with. (Sections 7.32.1 and 7.33.1)

Quality control

(a) When presented with the specification for the design or supply of dangerous goods means of containment by a customer, ensure that the means of containment meets the specifications. For example, a 45 gallon TC 17E drum made of all 20 gauge steel is not a specification drum and should not be manufactured.

Work with the shippers and advise them of any discrepancies between the packaging order and the specifications as detailed in the safety standards.

(b) Make sure that containers sold have been tested to the safety standards requirements. Marking means of containment with a Transport Canada specification number certifies compliance with the specification.

Recent acquisitions in the library:

a selected bibliography of materials available from the Alberta Public Safety Services Library.

Compiled by Teresa Richey
APSS Librarian

To borrow the material listed, send an interlibrary loan form to Alberta Public Safety Services (AEPS), 10320-146 Street, Edmonton, Alberta, Canada T5N 3A2. Materials located in our Coordination and Information Centre (CIC), at our Training School, the Government Emergency Operations Centre (GEOC) or our Reference Collection cannot be borrowed but can be referred to in the Library.

Anderson, Peter S. **Toward an integrated Australian disaster management information system : challenges and prospects for the 1990's.** South Melbourne, Australia : Centre for International Research on Communication and Information Technologies, (Policy Research Paper 4). 1990. 28 p.

HV 553 .A7 A52 1990, MAIN LIBRARY

Denning, Elaine J. **Hazardous materials as secondary results of flooding : a case study of planning and response**. Boulder, Colo. : Natural Hazards Research and Applications Information Center, (Quick Response Research Report 49). 1992. 20 p.

HV 622 .D46 1992, MAIN LIBRARY

Disasters and the small dwelling : perspectives for the U.N. I.D.N.D.R. Edited by Yasemin Aysan and Ian Davis. London : James and James Science, 1992. 246 p.

HV 551.3 .D57 1992, MAIN LIBRARY

Driver's guide to T.D.G.
Scarborough, Ont. : Carswell, 1992. 75 p.

KE 3763 .E44 1992a, REFERENCE

Emergency nursing : principles and practice. 3rd ed. Susan Budassi Sheehy (Editor). Toronto : Mosby-Year Book, 1992. 733 p.

RT 120 .E4 E48 1992, MAIN LIBRARY

Fischer, Henry W., et. al. **The impact of media blame assignation on the E.O.C. response to disaster : a case study of the response to the April 26, 1991 Andover (Kansas) tornado**. Boulder, Colo. : Natural Hazards Research and Applications Information Center, (Quick Response Research Report 48). 1992. 33 p.

HV 636 1991 .F57 1992, MAIN LIBRARY

Goodness, C.M., et. al. **The nature and causes of climate change : assessing the long-term future**. London : Belhaven Press, 1992. 248 p.

QC 981.8 .C5 G667 1992, MAIN LIBRARY

Handbook of emergency management : programs and policies dealing with major hazards and disasters. Edited by William L. Waugh and Ronald John Hy. Westport, Conn. : Greenwood Press, 1990. 336 p.

HV 555 .U6 H35 1990, MAIN LIBRARY

Hildebrand, Michael S., and Gregory G. Noll. **Gasoline tank truck emergencies : guidelines and procedures**. Stillwater, Okla. : Oklahoma State University, 1992. 51 p.

HE 5614 .H54 1992, MAIN LIBRARY

Hudson, Andrew. **Good riddance : waste management law in Alberta**. Edmonton : Environmental Law Center, 1992. 195 p.

KEA 420.5 .R4 H83 1992, MAIN LIBRARY

Population and disaster. Edited by John I. Clarke, et. al. Oxford : Basil Blackwell in association with International Geographical Union Commission on Population Geography, 1989. 292 p.

HV 553 .P66 1989, MAIN LIBRARY

Showalter, Pamela Sands and Mary Fran Myers. **Natural disasters as the cause of technological emergencies : a review of the decade 1980 - 1989**. Boulder, Colo. : Natural Hazards Research and Applications Information Center, (Working paper 78). 1992. 126 p.

HV 551.3 .S56 1992, MAIN LIBRARY

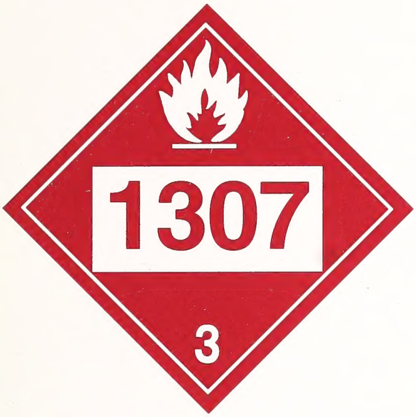
Theisen, Eric. **A Guide and explanation to the Canadian Transportation of Dangerous Goods Act and Regulations**. Scarborough, Ont. : Carswell, 1992. lv. (loose-leaf).

KE 3763 .E44 1992, CIC

The Training Division of Alberta Safety Services offers a number of Transportation of Dangerous Goods (TDG) courses and seminars to safety specialists and designated municipal officials. Our training course calendar describes all courses offered in Edmonton and around the province. Individual courses are also available. To obtain a copy, please call the APSS Training School at 422-0346 or write to:

Director of Training
Alberta Public Safety Services
P.O. Box 10,000
Edmonton, Alberta T5J 2P4

Product Profile



Xylenes

Xylenes are a mixture of three chemicals called isomers, which belong to the same family: ortho-xylene, meta-xylene and para-xylene. They are natural components in gasoline and make up to 5 per cent of the contents of crude oil. As a result, xylenes are present in our urban environment at levels of 10 to 100 ug/m^3 due to automobile emissions. The levels can rise to 200 ug/m^3 during rush hours.

In the past, xylenes were obtained from the distillation of crude oil, coal tar or coal gas. In Canada, they are now produced by reforming naphtha feedstocks in the presence of a catalyst. Current Canadian productions are located primarily in Ontario and in Quebec, with a small production unit in British Columbia. Over 400 kilotonnes of xylenes are produced yearly.

Commercially, xylenes are sold in a variety of grades. The most common grade in Canada is the solvent grade, which is a mixture of the three isomers with ethylbenzene. Xylenes are widely used as solvents in the manufacture of polyester resins, lacquers, enamels and rubber cements. They are the raw materials for production of adhesives, coatings, inks, dyes and insecticides. Xylenes also act as essential components in formulating aviation fuel and motor fuel. In the medical field, they are used to produce vitamins, pharmaceutical drugs and to sterilize surgical catgut. Finally, on a smaller scale, xylenes are used as a cleaning agent in microscopic techniques in the laboratory.

Xylenes are clear, volatile liquids with a sweet aromatic odour. They are soluble in alcohol and ether, but insoluble in water. Specific gravity of xylenes is 0.87, making them lighter than water. Vapour density of xylenes is 3.7, making the vapour heavier than air. The flash points of xylenes range from 27 C to 46 C and boiling points from 137 C to 144 C, making them flammable with moderate fire risk.

In case of a xylene fire, use dry chemical, foam or carbon dioxide. Water spray can be used to keep any fire-exposed container cool; but should not be used directly on a spill involved in a fire, as they may cause it to spread. Fire fighters should wear self-contained breathing apparatus (SCBA) when fighting the fire. Xylenes are heavier than air, they may travel to a low-lying source of ignition causing flash back.

Xylenes are normally stable in closed containers at room temperature. Polymerization does not occur. However, they will react explosively with acetic acid in air and may detonate immediately on contact with concentrated nitric acid.

Environment Canada rates xylenes as one of the fifty most frequently spilled chemicals in Canada. In the event of a major spill or leak, all sources of ignition should be removed immediately. The discharge should be stopped, if there is no risk. Be aware that the lower explosive limit of xylenes is approximately 11,000 ppm. Cleanup personnel must wear gloves, aprons, goggles and respirators to protect them from direct contact. Inert materials such as sand or vermiculite should be used to absorb and contain the spill. Non-sparking tools must be used to place waste liquid or absorbent materials into covered containers for disposal. Waste materials should be kept out of sewers and waterways; and should eventually be destroyed by incineration.

Subjects exposed to 200 ppm of xylene vapour for 3 to 5 minutes will experience irritation in their eyes, nose and throat. Inhalation of greater than 200 ppm will cause anorexia, nausea, vomiting and abdominal pain. At concentrations of 690 ppm, some people might experience tearing and dizziness. It has been documented that of three workers exposed to 10,000 ppm of xylene vapour for 18.5 hours, one died from pulmonary edema and two had temporary liver and kidney failure.

With a toxicity of Oral rat LD50 4300 - 5000 mg/Kg, xylenes are moderately toxic by ingestion. In general, ingesting xylenes will cause a burning sensation in mouth and stomach, nausea, vomiting, headache, cramps, kidney and liver damage. In contact with skin, xylenes can cause dryness and dermatitis. Xylenes are central nervous system depressants and have been selected by U.S. Environment Protection Agency for mutagenicity and teratogenocity testing. Prompt medical treatment should be followed in all cases of xylene exposure.

In spite of all the health hazards of xylenes, the major hazard for a first responder to a spill is flammability. According to Transportation of Dangerous Goods Regulations, xylenes have two listings under Class 3, Flammable Liquids, depending upon the flash point and boiling point of the mixture. They are:

(1) XYLENES...UN1307, Class 3.2, Sub-Class 9.2, Packing Group II

(2) XYLENES...UN1307, Class 3.3, Sub-Class 9.2, Packing Group III.

The products are usually shipped in non-pressurized containers such as rail tank cars, tank trucks and in drums. Class 3 flammable liquid labels or placards should be used during transportation.

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A dangerous goods route solution that works

Bill Bruce
Traffic Services Coordinator
City of Calgary

Calgary has approximately 150,000 people working in the downtown core on any given day. For this reason, the Dangerous Goods Routes By-law prohibits the transportation of placardable quantities of goods in the downtown core from Monday to Saturday between 6 a.m. and 6 p.m. Applications can be made to the Fire Marshal for an exemption permit if it can be demonstrated that compliance to the restriction is not practical.

Many of the products used daily by businesses in the downtown area require placarding, such as compressed gases used in downtown medical and dental clinics, the medical waste created by those businesses and also ammonia, commonly used in the blueprinting process. All of these businesses operate during standard business hours, which makes compliance to the by-law virtually impossible.

"We had two choices - ship dangerous goods in smaller quantities or transport materials outside of regular business hours. In the majority of cases, these choices weren't workable," says Keith Mundy of the Alberta Trucking Association. "There are some chemicals, regardless of quantity, that had to be placarded as a dangerous good. We needed another solution."

The dangerous goods route committee determined that a better system needed to be developed that would safeguard the public without unduly restricting normal business operations in the downtown area. After reviewing the types of material involved and industry needs, the committee came up with a solution: an amendment to the by-law that would allow dangerous goods to be transported downtown between 9:30 a.m. and 11:30 a.m., and from 1:30 p.m. to 3:30 p.m., provided that none were transported in containers with a capacity greater than 454 litres. This amendment allows businesses to operate within their normal hours without compromising public safety, since the majority of goods are transported in small quantities during periods when the pedestrian and vehicular traffic levels are low.

"I have had no negative feedback," says Mundy. "It works. Everyone is happy and it is such a simple solution."

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